Forest Genetics Council of BC
Business Plan 2012 / 13

Budgets list only funds provided by the
provincial Land-Base Investment Strategy
Tree Improvement Program

Budgets approved
by the Forest Genetics Council of BC on
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FGC Program Manager

Message from the FGC Co-Chairs

We are pleased to present the 12th consecutive annual business plan prepared by the Forest Genetics Council of BC (FGC) and its technical advisory committees. This plan describes activities funded through the Land Base Investment Strategy (LBIS) and supported by various agencies who contribute to FGC's strategic goals and objectives.

As in past years, this 2012/13 Business Plan outlines a balanced set of activities to enhance the conservation, resilience, and value of BC's forest genetic resources. These activities are grouped into subprograms, including select seed production, tree breeding, genecology, genetic conservation, cone and seed pest management, decision support, and extension. LBIS budget allocations and performance indicators are included for most of these subprograms and projects. Species plans, which constitute the bulk of this plan, identify current status and future projections for breeding programs, seed orchards, seed quality, and seed use by seed planning unit.

A primary objective of the FGC is to raise the level of select seed use to 75% provincially by 2014. We have only two years remaining to reach this target. With 2011 sowing of select seed at 62%, there is some distance to go. The primary challenge standing in the way of reaching this goal is the orchard-production of lodgepole pine seed. Efforts to increase seed production have met with some success, but lodgepole pine orchards continue to not meet expectations, with some exceptions. Orchard production of most other species is on target.

Developing a climate-based seed transfer system is another objective of Council. The scientific foundation for this important initiative is well underway, but implementation will be several years away. More immediately, timber supply issues in central BC are receiving considerable attention in the post-mountain-pine-beetle era. Tree improvement is an important tool that can help mitigate timber supply fall-down over the mid- to longer-term. This issue will continue to be a focus of seed production and planning for interior species.

This plan represents the collaborative effort by many people working in government, the private sector, and universities throughout the province. Cooperation and hard work are the hallmarks of this program and, in large measure, the basis of its success. We would like to thank all the people who contribute to the provincial forest genetics conservation and management program. Your service is greatly appreciated.

Kerry McGourlick, RPF
FGC Co-chair
Western Forest Products Ltd.

Brian Barber, RPF
FGC Co-chair
Ministry of Forests Lands and Natural Resources

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1.0 Introduction

This section overviews the relationship between the multi-stakeholder Forest Genetics Council and its co-operators in the planning and implementation of forest genetic resource management activities in British Columbia, and for the management and allocation of funds under the Land Base Investment Strategy (LBIS) Tree Improvement Program.

1.1 Forest Genetics Council of BC

The Forest Genetics Council of BC (FGC) is a multi-stakeholder group representing the forest industry, Ministry of Forests Lands and Natural Resource Operations (MFLNRO), universities and the Canadian Forest Service. Council's mandate is to lead a provincial forest genetic resource management (GRM) and tree improvement and program that encompasses the conservation, controlled use, and value-enhancement of the genetic resources of forest tree species, and to advise the Provincial Chief Forester on forest genetic resource management policies and budgets.

The FGC reports to the Provincial Chief Forester, and provides a forum for stakeholder representatives to set objectives and to oversee the development and delivery of a cooperative Business Plan to fulfill these objectives. The vision statement and objectives set out in the FGC Strategic Plan for the period 2009 to 2014, are:

Vision statement:

BC's forest genetic resources are diverse, resilient, and managed to provide multiple values for the benefit of present and future generations.

Objectives:

1. Adequately conserve the genetic diversity of key populations of all forest tree species native to BC by 2015, through a combination of in situ, ex situ, and inter situ conservation.
2. By 2020, high-quality genecology research information will guide operationally efficient climate-based seed transfer policy and practice for all trees planted in BC.
3. Increase the average volume gain of select seed used for Crown land reforestation to 20% by the year 2020.
4. Increase select seed use to 75% of the provincial total sown by 2014.
5. Coordinate stakeholder activities and secure the resources needed to meet Business Plan priorities.
6. Monitor and report progress in genetic resource management activities.

This Business Plan defines the annual set of activities and budgets needed to achieve these objectives.

1.2 A Co-operative Effort

Forest genetic resource management in BC is a co-operative effort. The MFLNRO leads tree breeding activities, while both private industry and the MFLNRO manage seed orchards for the operational production of select seed. Genecology research is undertaken by the MFLNRO and universities in support of seed transfer policy, climate-change response, and genetic conservation. Industry provides logistical support for field trials and input on the development of priorities. Universities also contribute through research in genetic conservation, seed orchard management, and genomics, as well as the development of climate models. Policy development for Crown lands is the responsibility of the MFLNRO, with advice provided to the Provincial Chief Forester through the FGC.

1.3 Land-Base Investment Strategy Tree Improvement Program

The Land-Base Investment Strategy (LBIS) encourages investments in the forest resource that maximize productivity and value while supporting forest resilience. The Tree Improvement Program supports specific implementation priorities related to timber supply, fast-growing forests, and adaptation to climate change.

LBIS objectives call for 7.1 million cubic meters of additional annual timber supply provincially in 65 years. Of this, 4.3 million cubic meters are expected to be provided through the LBIS Tree Improvement Program. Investments to meet this objective are made in accordance with program and budget recommendations developed by the FGC through an annual business planning process. FGC objectives are aligned with MFLNRO objectives, and are set out in the FGC Strategic Plan for 2009 to 2014. The MFLNRO administers funding through the subprogram areas identified in the FGC Strategic and Business Plans (Figure 1).

Business planning carried out through the existing FGC-led process, includes Technical Advisory Committees (TACs) undertaking specific planning activities, developing budgets, and making operational recommendations (Figure 2). The FGC reviews and makes final recommendations for subprogram budgets and activities, and ensures the overall program meets MFLNRO and LBIS objectives and administrative requirements. The program is managed and coordinated by the FGC Program Manager on behalf of the FGC, with substantial input from FGC Co-Chairs, Technical Advisory Committee (TAC) Chairs, and others.

In addition to LBIS Tree Improvement Program investments and MFLNRO direct program investments through staff and in-kind support, private companies also fund activities under Council's Business Plan. The species plans found in Appendix 3 outline general strategy, predict orchard seed production and gain, summarize conservation status, and provide key seed-use and availability statistics for individual species and seed-zone combinations known as seed planning units (SPU).

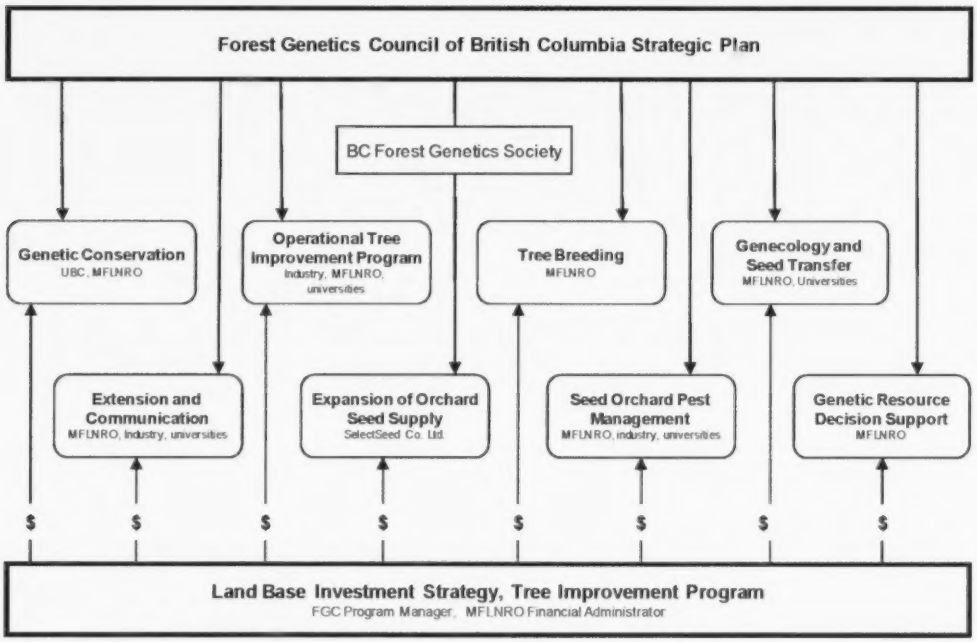


Figure 1 **Relationship between the FGC Strategic Plan, Land Base Investment Strategy Tree Improvement Program, and business plan development through FGC subprograms.**

2.0 Process for Business Plan Development

2.1 The Role of Council and its TACs

FGC members, representing the MFLNRO, forest companies, universities, and the Canadian Forest Service, provide strategic direction to the provincial forest genetic resource management program. FGC Technical Advisory Committees provide technical and policy information to Council and contribute to the development of FGC plans and associated budgets. The FGC Business Plan consolidates the subprogram plans and budgets into a comprehensive set of activities that address Council's objectives.

Council's seven TACs lay the groundwork for the FGC Business Plan:

- The Coastal and Interior TACs review and advise on Tree Breeding and Operational Tree Improvement Program (OTIP) subprograms, and provide input to species plans that guide work done by SelectSeed Company Ltd.
- The Genetic Conservation TAC (GCTAC) advises Council on issues related to genetic conservation, and identifies required activities and budgets under the Genetic Conservation Subprogram.
- The Seed Transfer TAC develops strategy and activities for genecology research and climate-based seed transfer policy.

- The Extension TAC (ETAC) is responsible for developing a strategy and annual activity plans for the Extension and Communication Subprogram.
- The Pest Management TAC (PMTAC) identifies information and research needs, and guides both research and extension activities, for the control of insect and disease pests impacting seed orchards and seed production.
- The Genetic Resources Decision Support TAC (GRDS) oversees the development of activities and budgets for the GRDS Subprogram.

In addition to the seven advisory committees, Council establishes other committees as needed to advise on shorter-term projects.

Program financial administration is led by the MFLNRO Tree Improvement Branch. Program management, including business plan and annual report compilation, is led by SelectSeed Company Ltd. (SelectSeed), on behalf of Council.

Council reviews all strategies, plans, or recommendations from its TACs and from SelectSeed for approval (or revision) before incorporating them into the FGC Business Plan. Figure 2 illustrates this hierarchical structure and the link between FGC objectives, planning processes, and the seven subprograms through which it is implemented. The process by which the Council Subcommittees or other agencies define activities and budgets for each subprogram is discussed in Section 3. Subprogram leaders are authorized to reallocate funds within their subprograms as necessary throughout the fiscal year, subject to limits and review process.

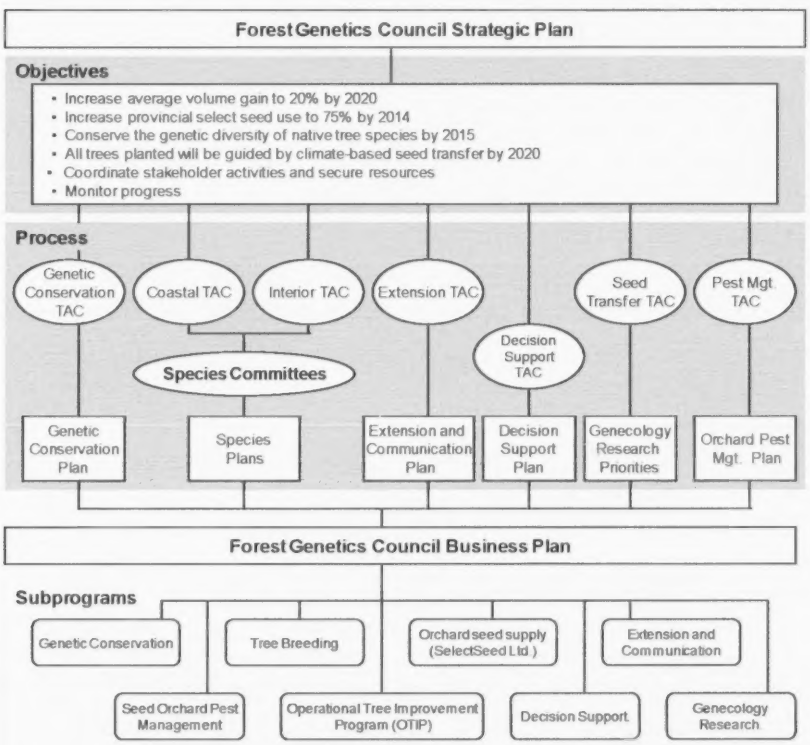


Figure 2 Link between FGC objectives, planning processes, and the subprograms of the FGC Business Plan

3.0 Subprogram Planning and Management

3.1 Genetic Conservation Subprogram

Genetic conservation activities monitor and catalogue genetic resources for indigenous tree species, research conservation methods and needs, provide background genecology information for non-commercial species, and provide guidance to the FGC and the MFLNRO on policy development.

3.1.1 Planning

Genetic conservation activities are developed through the FGC Genetic Conservation TAC (GCTAC), with programs and spending approved by the FGC.

3.1.2 Management

Subprogram delivery is primarily shared by the Centre for Forest Conservation Genetics at the University of BC (CFCG) and the Tree Improvement Branch of the MFLNRO. The Provincial Tree Seed Center (Tree Improvement Branch) maintains an ex-situ seed inventory. The GCTAC sets broad objectives and provides budget recommendations to the FGC.

The CFCG receives funding through a Transfer Agreement with the MFLNRO under the LBIS Tree Improvement Program. In addition, the Centre collaborates with other groups and agencies, and seeks funding from other sources as opportunities arise. Significant adjustments in technical objectives or budgets for projects funded through the LBIS must be approved by the GCTAC.

3.1.3 Activities and Budget

The Centre for Forest Conservation Genetics will help identify specific *in situ* and *ex situ* conservation needs and strategies, and will assist with forest certification and climate change issues as they relate to genetic conservation and management. Investments through the CFCG also allow leveraging of funds with other provincial, national, and international agencies in the area of conservation genetics. The focus for 2012/13 will be climate modeling (ClimateBC and Climate WNA) in collaboration with $1.8 million of other funding for the AdapTree project, primarily through Genome Canada. Other projects will continue with completion of work on the genetic structure of interior spruce and on the genecology of garry oak expected.

In the 2012/13 fiscal year, the Centre will receive $147,420 for projects listed in Table 1. In addition, the Centre will continue to provide expertise on climate change impacts, seed-transfer options, and ongoing planning and policy developments related to climate change.

A budget of $63,300 is allocated to the Forest Genetics section of the Tree Improvement Branch for projects listed in Table 1. These include conservation and research seed collections for whitebark pine and other species, developing a testing strategy for whitebark pine, trembling aspen genetic architecture, and enhancements to the genetic conservation catalogue. Projects testing conservation seed bank viability and bigleaf maple seed will be carried out by the Provincial Tree Seed Centre.

Table 1 **Conservation subprogram budget for 2012/13. Leveraged funding from other agencies is included.**

Project	2012-13 FGC / LBIS Budget	2012-13 Other funding
UBC Centre for Forest Conservation Genetics		
Climate change		
Testing climate change predictions for whitebark and lodgepole pine	$ -	$ 500
Modelling seed transfer options	$ -	$ -
chamber expts)	$ -	$ -
AdapTree Project:		$ 1,845,800
Climate modelling	$ 88,000	$ -
Computing supplies	$ 2,000	$ -
CFCG & AdapTree website update	$ 4,000	$ -
Adaptive diversity in seed orchard lots	$ 16,500	$ 5,500
Non-Commercial species		
Genecology of Garry oak	$ 6,000	$ -
Populations genetics and genecology of Pacific dogwood	$ -	$ -
Arbutus genecology	$ 5,000	$ 4,000
Other projects		
Genetic structure and conservation of managed interior spruce populations	$ 9,000	$ 3,000
General CFCG expenses		
Extension	$ 3,000	
Office, lab and computing expenses	$ 3,000	
Projects total	**$ 136,500**	
UBC Overhead 8%	$ 10,920	
Total for UBC Center for Forest Conservation Genetics	**$ 147,420**	**$ 1,858,800**
MFLNRO Tree Improvemet Branch - Prov. Tree Seed Center		
Seed bank moisture content testing / bigleaf maple seed testing	$ 7,000	
MFLNRO Tree Improvemet Branch - Forest Genetics Section		
Genotyping trembling aspen	$ 13,000	
Ex situ seed collections	$ 37,780	
Genetic conservation catalogue	$ 1,000	
Whitebark pine seed collections for blister rust screening and development of a screening plan	$ 13,800	
Total for MFLNRO	**$ 72,580**	
TOTAL	**$ 220,000**	**$ 1,858,800**

3.2 Tree Breeding Subprogram

The Tree Breeding Subprogram focuses on the continued development of parent trees selected for traits that will enhance timber supply and stand resilience. Selected parent trees are used for the production of seed and vegetative material. Tree breeding activities include selecting parents in wild stands, propagation, field-testing offspring, mating, establishing/maintaining/measuring trials, and support research. No research effort or funding is for the development of genetically modified trees. For most provincial programs, selection from wild stands is largely complete. Breeding strategy and level of advancement vary, but all breeding programs are well into field testing and selection at either the first or second generation. This Subprogram also includes

realized-gain trials that quantify area-based gains in timber production, and support research on pests and other issues that impact the achievement of genetic gains in timber supply and quality. Some genecology research associated with progeny tests is also carried out. The tree breeding subprogram is implemented by the Forest Genetics Section of the MFLNRO Tree Improvement Branch .

3.2.1 Planning

Priorities for breeding activities are set among seed planning units using value traits related to timber supply, expected future impact under climate change, and logistical considerations such as ease (cost) of operating breeding and seed orchard activities. Breeding, genecology, and genetics research strategies developed by MFLNRO tree breeders were reviewed by FGC Interior and Coastal TACs, and direction was given to ensure alignment with FGC strategic objectives and with ongoing operational needs and programs.

Tree Breeding Subprogram budgets were developed at the SPU level by the MFLNRO breeder responsible and reviewed by TAC members. These budgets were then adjusted by the Manager, Forest Genetics, MFLNRO Tree Improvement Branch to find efficiencies and to meet the total expected Subprogram budget allocation.

3.2.2 Management

The MFLNRO manages Tree Breeding Subprogram activities, with progress reported to cooperators through the FGC. The Manager of Forest Genetics, MFLNRO Tree Improvement Branch, has authority for project re-allocations in support of FGC objectives. Substantial re-allocations between seed planning units or from breeding activities to technical support activities require the agreement of the Director, Tree Improvement Branch and the FGC Program Manager.

3.2.3 Activities and Budget

The 2012/13 budget for the Tree Breeding Subprogram is $1.062 million, including support for clonebank and research installation maintenance at the Cowichan Lake Research Station and Skimikin Seed Orchards. Table 2 summarizes budgets and key performance indicators (KPI) for breeding activities by SPU and activity.

3.3 Operational Tree Improvement Program (OTIP)

The OTIP subprogram supports FGC objectives to increase the quality and quantity of select seed produced from existing private and MFLNRO seed orchards. It also provides technical support for orchard production and management.

3.3.1 Planning

OTIP investment is based on input from the Interior and Coastal TACs and on species plans that outline seed production strategies within each SPU. Based on these strategies, and on priority lists approved by the TACs, a formal call for proposals is issued.

Review committees set up by the Interior and Coastal TACs review and rank all proposals against FGC objectives and SPU priorities, based on technical merit, impact, value, and cost. OTIP projects are selected to increase the genetic gain in seed made available for reforestation and to increase the quantity of seed produced from existing orchards. They support FGC short-

term objectives for gains in the growth rate, pest resistance, and wood quality of reforestation materials. They also support FGC long-term objectives through the replacement of trees in existing seed orchards with trees of higher genetic value. The total budget allocation for OTIP is recommended by the FGC to the provincial Chief Forester and LBIS managers in the MFLNRO.

3.3.2 Management

The MFLNRO Tree Improvement Branch administers OTIP in accordance with recommendations from the FGC. Requests for re-allocations or for new funding are handled by the MFLNRO Tree Improvement Branch Manager of Business Operations in consultation with the appropriate TAC and the FGC Program Manager. All projects report on key performance indicators to enable tracking of planned activities.

3.3.3 Activities and Budget

The 2012/13 OTIP budget is $584,000, with allocations of $468,400 to coastal orchards and $115,600 to interior orchards. Table 3 outlines approved OTIP budgets and performance indicators for all seed planning units.

3.4 Expansion of Orchard Seed Supply Subprogram (SelectSeed Co. Ltd.)

This subprogram was established in 1999 to address a need for seed orchard capital investment to meet FGC objectives. For seed planning units (SPU) with insufficient orchard capacity, as determined by the ITAC and CTAC at the time, orchard-development investments were initiated through SelectSeed Company Ltd. using competitive bids and long-term contracts.

SelectSeed is wholly owned by the Forest Genetics Council through the B.C. Forest Genetics Society. All Society members are on Council. The SelectSeed Board of Directors is elected by Society members (Figure 3). SelectSeed's mission is to "support Forest Genetics Council objectives for the development of seed orchard facilities to meet the provincial demand for high quality, genetically adapted tree seed through investments, cooperative work with FGC members and effective program management."

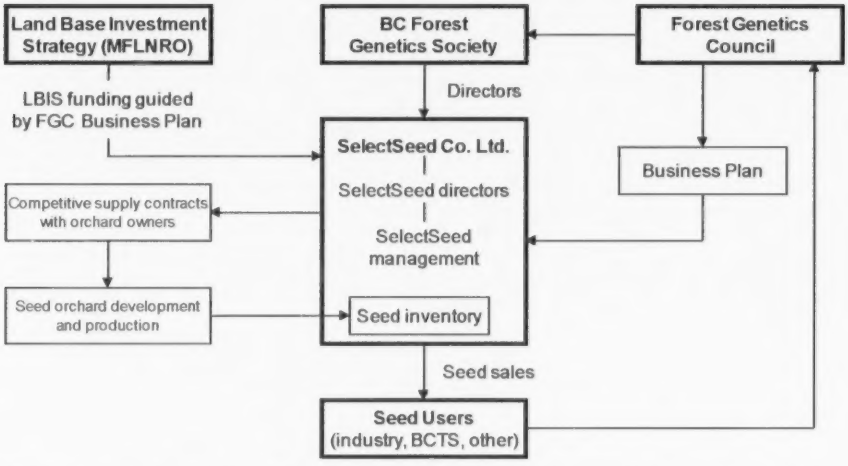


Figure 3 Organizational relationships among SelectSeed Ltd., Land Base Investment Strategy, Forest Genetics Council, and the B.C. Forest Genetics Society

3.4.1 Planning

SelectSeed's Business Plan and investments are based on the long-term Strategic Plan and annual business plans prepared by the FGC and its associated committees. Species plans (Appendix 3) contain analyses of projected orchard expansion needs that guide SelectSeed investments. Specific technical advice is sought as required from Species Committees or others.

3.4.2 Management

Management discretion for spending lies with the SelectSeed Board of Directors, and is limited by the terms of the SelectSeed Multi-Year Agreement with the MFLNRO. Investments in new orchards will be approved by the FGC and follow FGC and TAC guidance, with emphasis on both the technical quality of developments and on cost. SelectSeed's annual business plan was approved by the Forest Genetics Council on March 16, 2011.

3.4.3 Activities and Budget

In 2012/13, SelectSeed will continue to focus on the management of 11 long-term orchard agreements covering the operation of 14 orchards (Table 5). Propagation for a new Douglas-fir orchard for higher elevations in the Thompson Okanagan zone is also underway.

Seed orchard management activities to maximize seed crop production will continue in the 14 original orchards. In addition, about 500 ramets will be planted across all orchards to replace mortality and about 900 grafts will be made for future mortality replacement and for development of a new Douglas-fir orchard for the Thompson Okanagan high elevation SPU. All grafting and holding work is done through contracts. Seed production for 2012 is forecast at 53 kilograms of lodgepole pine, 27 kilograms of Douglas-fir, and 19 kilograms of spruce. Expected gross revenue from seed sales are forecast at $600,000.

Other activities will include program management on behalf of the Forest Genetics Council, including Business Plan and budget development, committee support, managing program development and subprogram interactions, and preparation of mid-term and annual reports.

Table 2 **2012/13 budgets ($ x 1000) and KPI by seed planning unit for tree breeding and associated technical support activities. See Species Plans (Appendix 3) for more detail on seed planning units.**

Seed Planning Unit				*220 Selection and Breeding*								*230 Progeny testing*										*240 Technical Support*								Total $
				211		221		222		223		231		232		233		234		235		240-1		240-2		240-3		240-4		
				# genotypes selected		# genotypes establ. in arboreta / archives		# genotypes maint. in breeding arboreta		# crosses made		# test sites sown		# progeny sites establ. / prepped		# progeny test sites maintained		# of progeny sites assessed		# of test sites analyzed		Projects								
#	Spp.	SPZ	Elev (m)	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	x 1000
1	Fdc	M	1-700			100	8	100	3	6	1	1	2	1	1	21	70			4	31	1	5							121
2	Cw	M	1-600			100	3	550	2	200	10	3	10	3	35	8	42	8	64			1	26							192
3	Hw	M-S	1-600			125	1	150	1							8	15	3	11	3	1	5	7							36
4	Sx	NE	1000-1500							100	5																			5
5	Sx	NE	1500-1900																											0
6	Ss	M	1-500	100	3											8	20				14	1	10	1	14	1	6	1	2	69
7	Pli	NE	700-1400					1,657	13							4	7	9	22											43
8	Pwc	M/SM	1-1400	60	4	60	5			30	7	3	5	3	9	2	18	6	14											61
9	Ba	M	1-1000																											0
10	Pli	TO	700-1400	40	5													1	10											15
11	Yc	M	1-1100	100	2	400	4							12	28	6	15					1	6							55
12	Pli	PG	700-1200																											0
13	Lw	NE	700-1400					2,000	20	100	5					4	15	4	25											65
14	Sx	PG	600-1200													2	8	2	35					5	40	5,000	8			91
15	Pwi	KQ	500-1400					300	4	20	6							3	16			1	3							29
16	Pli	TO	1400-1600													5	9													9
17	Pli	BV	700-1200													3	11	1	6											17
18	Pli	CP	700-1100															2	20											20
19	Fdc	SM	400-1200													8	17													17
20	Pli	NE	1400-2000																											0
21	Fdi	NE	400-1000							100	5											5	19							24
22	Fdi	NE	1000-1600							100	5					4	15	4	25											45
23	Sx/Ss	SM/NST	all																											0
24	Hw	M	600-1100													4	14	4	12											26
25	Sx	EK	750-1700			400	4																							4
26	Pli	PG	1200-2000							15	4																			4
27	Cw	SM	200-1000													2	5	2	6											11
28	Sx	TO	1300-1900									140	10																	10
29	Pli	EK	1500-2000																											0
30	Sx	TO	700-1300																											0
31	Fdc	M	700-1200																											0
32	Pli	EK	800-1500															1	5											5
33	Cw	SM	600-1500													2	5	2	6											11
34	Lw	EK	800-1500							100	5																			5
35	Sx	BV	500-1200																											0
36	Bg	M	1-700																											0
37	Fdi	QL	700-1200																											0
39	Fdi	EK	700-1400																											0
40	Sx	PR	650-1200																											0
41	Fdi	PG	700-1000																											0
42	Sx	PG	1200-1550																											0
43	Fdi	CT	600-1200																											0
44	Sx	NE	1-1000							35	2																			2
45	Pli	BB/CHL	all													4	13													13
46	Bl	all int.	all																											0
47	Bn	M	all																											0
48	At/Ep/C	interior	all																											0
49	r/Ct/M	Coast	all	100	12			145	3	70	10					2	2													27
50	Lw	NE	1200-1800																											0
51	Yp	S Int.	300-1200																											0
	Clonebank maintenance and upgrades at the Cowichan Lake Research Station																													30
	Totals			400	26	1,185	25	4,902	46	876	65	147	27	19	73	97	301	52	277			15	76	6	54	5,001	14	1	2	1,062

Table 3 2012/13 budgets ($ x 1000) and KPI by seed planning unit for OTIP projects. See species plans (Appendix 3) for SPU detail.

Seed Planning Unit				320 Quality / Quantity Boosts														340 Pest Management						350 Tech Support		Total
				321 Grafting (# grafts)		322 Hold grafts (# ramets)		323 Replacement (# ramets)		324 Roguing (# rogued)		325 SMP/CP (# ramets)		326 Induction (# ramets)		327 Orch mgt. (# ramets)		331 Cutting donors (# cuttings)		341 Insect control (# ramets)		342 Disease control (# ramets)		343 Monitoring (# ramets)		# of reports		$x1000
#	Spp	SPZ	Elev (m)	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	$
1	Fdc	M	1-900	1305	6	1129	3	905	7	521	1	1219	6	892	1	7984	16			3126	4			8488	2	1	6	51.9
2	Cw	M	1-700			522	1			66	1	387	4	252	1	724	3	6500	7	561	2			921	1			20.7
3	Hw	M	1-600							420	3					337	1							337	0			3.8
4	Sx	NE	1000-1700							400	11					281	0					991	0	991	1			12.4
5	Sx	NE	1700-2100																									0.0
6	Ss	M	1-500							100	1									757	1			757	0			2.2
7	Pli	NE	700-1600			102	0	52	1	395	7	3904	4			1513	3			12951	11	5351	3	14183	5	1	36	69.9
8	Pw	M/SM	1-1000	600	5	80	0	551	0											551	1							6.4
9	Ba	M	1-1000																									0.0
10	Pli	TO	700-1400					4240	4	40	0	2282	1			5208	4			9619	11	9619	3	9619	4			27.4
11	Yc	M	1-1100													3440	2	15082	15	9982	2					1	12	30.5
12	Pli	PG	700-1400	1500	13	2918	6	1024	11	100	0	8612	14			4275	5			21563	15	5934	2	16763	6	1	3	74.4
13	Lw	NE	700-1600													462	1			1621	6	1621	1	1621	1			8.8
14	Sx	PG	600-1400							300	7									2079	2							8.6
15	Pw	KQ	500-1400			23	0	29	0							393	1			2745	9	2406	1	12630	3			13.6
16	Pli	TO	1400-1600	900	8	900	1					3504	2			3120	2			3504	6	3504	2	3504	1			21.7
17	Pli	BV	700-1400	1600	14	2264	4	911	11	500	8	6878	12	150	0	2163	2			13272	9	5490	2	18575	7			68.6
18	Pli	CP	700-1300	2500	22	2500	3					8682	13	150	0	3713	3			6930	7	3010	1	9562	4			53.7
19	Fdc	SM	200-1000			254	1					656	1			882	5			1136	1					1136	0	8.5
20	Pli	NE	1600-2000																	1782	2	1782	1	1782	1			3.3
21	Fdi	NE	400-1200									800	2	600	2	731	1			2194	3	2194	1	2194	1			10.3
22	Fdi	NE	1000-1800									1507	3	502	2	724	1			2896	12	2896	1	2000	1			19.6
23	Sx/Ss	SM/NST	all																									0.0
24	Hw	M	600-1100																									0.0
25	Sx	EK	750-1900																									0.0
26	Pli	PG	1400-2000																									0.0
27	Cw	SM	200-1000																									0.0
28	Sx	TO	1300-2100							273	6	1056	0			1056	0			1056	4	1056	0	1056	1			11.8
29	Pli	EK	1500-2000																									0.0
30	Sx	TO	700-1500							227	5	454	0			150	0			454	2	454	0	454	0			7.3
31	Fdc	M	900-1200	81	1	114	0	12	0							243	1			361	0							2.1
32	Pli	EK	800-1500									1816	3			596	1			2383	4	2383	1	2000	2			11.5
33	Cw	M	700-1500																									0.0
34	Lw	EK	800-1700																									0.0
35	Sx	BV	500-1400							350	10											2329	1	2329	2			12.2
36	Bg	M	1-700																									0.0
37	Fdi	QL	700-1400									339	1	400	1					1185	0			1185	1			3.6
39	Fdi	EK	700-1400									1	1	175	1	262	0			1048	4	1112	0	1112	1			6.7
40	Sx	PR	650-1200	80	1	183	0	52	0					500	2	920	2			3780	10	3780	1	3780	1			16.7
41	Fdi	PG	700-1200									1	1	460	1					1265	1			1055	1			3.3
42	Sx	PG	1200-1550																	1017	1			1017	1			1.3
43	Fdi	CT	600-1400											450	1					962	0			962	1			2.4
44	Sx	NE	1-1000																									0.0
45	Pli	BB/CHL	all																									0.0
46	Bl	all int.	all																									0.0
47	Bn	M	all																									0.0
48	At/Ep/Ct	interior	all																									0.0
49	Dr/Ct/Mb	Coast	all																									0.0
50	Lw	NE	1200-1800																									0.0
			Totals	8566	68	10989	20	7776	35	3692	60	42098	68	4531	13	39177	53	21582	22	110780	130	55912	20	118877	47	1140	58	595.5
																									Risk managed			12
																									Total		$	584.0

Forecast spending for 2012/13 is $950,000, including $183,800 spending on FGC management and support activities. Seed production forecasts are based on long-term production curves for similar orchards, but annual production can vary widely.

Table 4 **SelectSeed Company Ltd. 2012/13 forecast income and expenses by category.**

Category	Projected expenses and income				
	Total	Q1	Q2	Q3	Q4
EXPENSES					
SelectSeed					
Orchard management	466,000	170,000	50,000	150,000	96,000
Propagation , holding and orchard support	22,000	0	0	0	22,000
Crop production / seed extraction	149,400	0	9,000	110,000	30,400
SelectSeed management, legal, accounting	128,800	31,000	31,000	31,000	35,800
Total SelectSeed costs	**766,200**	**201,000**	**90,000**	**291,000**	**184,200**
FGC management and support					
Management, legal, communication, etc.	128,800	31,000	31,000	31,000	35,800
NSERC Industrial Chair support	55,000	55,000	0	0	0
Total FGC costs	**183,800**	**86,000**	**31,000**	**31,000**	**35,800**
Total Expenditures	$950,000	$287,000	$121,000	$322,000	$220,000
INCOME					
Seed sales	600,000	0	0	100,000	500,000
Interest from investments	10,000	2,500	2,500	2,500	2,500
Total Income	$610,000	2,500	2,500	102,500	502,500
Income minus expenses	($340,000)				
Cash from (to) reserve	($200,000)				
Total MYA support	**$540,000**				

Table 5 **Orchards under contract to SelectSeed Company Ltd.**

Seed planning unit				
SPU#	**Species**	**Seed zone**	**Planned # ramets**	**Location**
21	Fdi	NE low	2187	Armstrong - Grandview
37	Fdi	QL	776	Vernon
41	Fdi	PG	786	Vernon
28	Sx	TO high	1056	Armstrong - Eaglerock
30	Sx	TO low	454	Armstrong - Eaglerock
7	Pli	NE low	1000	Armstrong - Grandview
10	Pli	TO low	4796	Armstrong - Grandview
12	Pli	PG low	4884	Kettle Valley
12	Pli	PG low	4500	Vernon
16	Pli	TO high	3508	Armstrong - Eaglerock
17	Pli	BV low	3000	Vernon
17	Pli	BV low	3100	Sorrento
18	Pli	CP low	2000	Sorrento
18	Pli	CP low	3100	Kettle Valley
53	Fdi	TO high	1900	To be determined
		TOTAL	37,047	

3.5 Extension and Communication

The Extension and Communication Subprogram supports FGC goals and objectives through:

- extension (providing client-focused solutions and training to seed users and tree improvement specialists),
- communication (developing and disseminating information on the program and its activities to all FGC target audiences),
- training.

3.5.1 Planning

Extension and communication activities are developed and guided by the FGC Extension Technical Advisory Committee (ETAC). ETAC includes representatives from the MFLNRO, forest licensees, and the private consulting community.

The ETAC extension and communication strategy is based on three broad goals:

1. To work closely with Council and its TACs to coordinate and manage extension efforts in support of Council's provincial genetic resource management program.
2. To provide information and policy advice to Council on issues related to extension
3. To act as a forum for user feedback.

3.5.2 Management

ETAC identifies goals and audiences for extension, communication and education activities, and with the assistance of an Extension Coordinator from the MFLNRO Tree Improvement Branch, develops a business plan. The Coordinator is responsible for the management of ETAC activities, and the coordination of ETAC work in conjunction with Council and other committees of Council. Projects are undertaken through contracts or through direct delivery by cooperators. Budget development for LBIS funds is first done by the ETAC, with final approval by the FGC. Project spending is approved by the ETAC Chair and the FGC Program Manager, and must meet administrative guidelines set out for LBIS funds. ETAC reports to Council on activities, progress, and spending at mid-year and year end.

3.5.3 Activities and Budget

The extension and communication budget for 2012/13 is $28,000. In-kind, staff time and other contributions by affiliated agencies and companies are incremental to this amount and are not listed. Projects and budgets are summarized in Table 6.

Table 6 Extension and communication projects and budgets for 2012/13

Project	Budget ($)
Workshops	
Climate-based seed transfer information (Victoria)	6,000
Forestry and genetic resource management workshop for genomics researchers and students	1,500
Introduction to genetic resource management (Haida Gwaii or Northwest)	5,500
Field days	
Silviculture committees or working groups; support for sessions on genetic resource management	2,000
Publications	
Tree Improvement in BC – update and printing	2,000
Seed orchard production in BC – development and printing a brochure	5,000
"Flying" BEC zones with climate change (Dr. Tongli Wang) – publication costs	2,000
Administration, opportunities and travel	4,000
Total	**$28,000**

3.6 Genetic Resource Decision Support Subprogram

The Genetic Resource Decision Support Subprogram (GRDS) supports FGC goals and objectives through the development of genetic information management systems. These systems assist clients in decision making, seed policy and planning, seed use, timber supply analysis, effectiveness evaluation, monitoring, and other GRM activities.

3.6.1 Planning

GRDS projects are developed and guided by a Technical Advisory Committee (TAC) comprised of ministry, industry and academic representatives.

3.6.2 Management

The GRDS TAC identifies short- and long-term goals that support the GRM information needs of clients. Significant project changes or re-allocations of funds from the approved Business Plan require approval of the TAC and the FGC Program Manager on behalf of the FGC.

3.6.3 Activities and Budget

Priorities for the 2012/13 fiscal year are to improve the ability of MFLNRO online systems to create, manage, display, and query seedlot area-of-use spatial information. Decision support information for climate-based seed transfer will also be further developed. A total of $90,000 is allocated to these projects.

3.7 Cone and Seed Pest Management Subprogram

The Pest Management Subprogram supports FGC objectives by reducing orchard seed losses to insect and disease pests through research, technical support, and the development of integrated pest management strategies in conjunction with orchard managers and pest management research and extension specialists.

3.7.1 Planning

The Subprogram is guided by a Pest Management Technical Advisory Committee (PMTAC), with membership from industry, the MFLNRO, the Canadian Forest Service, and universities. Issues are identified and ranked by the PMTAC based on perceived impact on seed losses, and the effect of these seed losses on FGC objectives. The TAC also makes recommendations to Council regarding subprogram organization, management, and budgets.

3.7.2 Management

With direction from the PMTAC, research proposals and pest management support activities were developed by the MFLNRO cone and seed pest management specialists. These were subsequently reviewed by Pest Management TAC members, and recommendations made for project modifications. The PMTAC recommended projects and budgets to the FGC.

The MFLNRO Tree Improvement Branch manages budgets and the financial administration of projects recommended by the PMTAC and approved by the FGC. Significant priorities and changes during the fiscal year are made in consultation with the TAC and the FGC Program Manager.

3.7.3 Activities and budget

The total Pest Management subprogram budget for 2012/13 is $112,500. In-kind, staff time and other contributions by affiliated companies and agencies are incremental to this amount. Projects and budgets are summarized in Table 7.

Table 7 Cone and Seed Pest Management Subprogram projects for 2012/13.

Project	Species impacted	Budget ($)	Products
Operational support for MFLNRO cone & seed pest biologist	All species	$ 25,000	Extension, pest management bulletins, overall support
Operational support for MFLNRO cone & Seed pest research laboratory	Sx, Fdi, Fdc, Lw, Pw	$ 6,300	Ongoing trial support; progress report
Pesticide trials to identify new pesticides and to develop data for their registration for use on cone and seed pests	Fdi, Sx	$ 49,000	Progress report
Synanthedon sequoia pitch moth control bole spray trial	Pli	$ 8,400	Progress report
Synanthedon sequoia pitch moth control attract-and-kill trial	Pli	$ 16,800	Progress report
Detecting *Leptoglossus occidentalis* seed bug feeding punctures on lodgepole pine seeds and impact on filled seed production	Pli	$ 7,000	Progress report
Total budget		**112,500**	

3.8 Genecology and Seed Transfer Subprogram

The purpose of the Genecology and Seed Transfer Subprogram is to effectively direct funding to priority genecology and seed transfer projects in support of FGC strategic objectives and provincial seed transfer policy development.

3.8.1 Planning

The subprogram is guided by the Seed Transfer TAC (STTAC), with representation from MFLNRO, industry, and university stakeholders. Priorities for genecology and seed transfer information needs are set within the context of other work currently underway, such as in the Breeding Subprogram, existing genecology trials, and seed transfer policy needs. The STTAC reviews priorities and projects set out by MFLNRO Tree Improvement Branch (TIB) scientists, leads the development of a call for proposals for non-MFLNRO projects, and makes recommendations to the FGC regarding budgets, priorities, and delivery process.

3.8.2 Management

The STTAC developed a list of priorities for genecology and seed transfer projects by species and type of work. Based on these priorities, a business plan was compiled by TIB scientists and reviewed by the STTAC. In addition, a call for proposals was released by the TIB on behalf of the STTAC and proposals were screened by a review committee of the STTAC. Funding recommendations were made to the FGC

The MFLNRO Tree Improvement Branch manages financial administration for approved projects through either direct spending within the Branch or through contracts with successful project proponents. Project financial and progress reporting is managed through the TIB, and incorporated in annual FGC reports.

3.8.3 Activities and budget

The total budget allocated to the Genecology and Seed Transfer Subprogram for 2012/13 is $544,240. This amount falls into three primary categories:

1. Proposals that were successful in a call for proposals open only to proponents outside the MFLNRO, totaling $91,931 (Table 8).
2. Projects led by scientists from the MFLNRO TIB totaling $276,500 (Table 9),
3. Assisted Migration Adaptation Trial investment led by the MFLNRO TIB and totaling $175,809 (Table 9),

Table 8 Genecology and Seed Transfer Subprogram projects led by non-MFLNRO proponents and approved through a call for proposals.

Species	Project title	Budget ($)	Performance indicator
Sx, Pli	Assessing the adaptive portfolio or reforestation stocks for future climates: common garden experiments. The project is part of the AdaptTree genomics project funded by Genome Canada.	$ 59,281	1 report
Fdc	Implications of ectomycorrhizal fungal maladaptation on successful seed transfer.	$ 32,650	1 report
Total budget		**$91,931**	

Table 9 MFLNRO Tree Improvement Branch Genecology and Seed Transfer Subprogram projects, recommended funding, and performance indicators (KPI).

Species	Genecology research priority	251 Seed procurement: # sources		252 Seedling production: # seedlings x 1000		253 Trial establishment: # test sites		254 Trial maintenance: # test sites		255 Trial measurement: # test sites		256 Trial Assessment: # test sites		257 Analysis of trials: # trials		Species total ($ x 1000)
		KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	KPI	$	
Pli	High															0.0
Fdi	High							6	30.0	6	40.0					70.0
Cwr	High															0.0
Fdc	High	16	3.0													3.0
Sx	High							21	30.0	3	15.0			16	10.0	55.0
Hw	High							12	18.0							18.0
Bl	Medium							8	17.0	2	2.5					19.5
Lw	Medium															0.0
Cwi	Medium					6	18	8	5.0							22.5
Ba	Medium							2	4.0	9	18.5					22.5
Pw	Medium											8	10.0			10.0
Yc	Medium															0.0
Ss	Low							4	4.0	6	6.0	6	4.0			14.0
Dr	Low															0.0
Ep	Low															0.0
Bg	Low									4	1.0					1.0
At	Low															0.0
Act	Low							3	10.0							10.0
Py	Low	200	6.0													6.0
Mb	Low							4	10.0							10.0
Bn	Low							5	15							15.0
Risk managed																0.0
AMAT*						12	125	36	11	36	40					175.8
Totals		216	9	0	0	18	143	109	154	66	123	14	14	16	10	452.3

* Assisted Migration Adaptation Trial; includes multiple species.

3.9 Applied Tree Improvement and Biotechnology

Work carried out under the Applied Tree Improvement and Biotechnology research program was, prior to fiscal year 2012/13, led by Dr. Yousry El_Kassaby from the University of British Columbia with guidance from a Steering Committee. For 2012/13, the FGC allowed limited funding proposals from other proponents for projects that support FGC objectives.

3.9.1 Planning

Project proposals received under this funding category are developed by proponents based on their knowledge of needs and opportunities within the broad provincial GRM program or on suggestions received from others active within the program. The intent is to provide a funding means for projects that have the potential to contribute to FGC objectives but do not fit the more specific funding requirements of FGC subprograms.

3.9.2 Management

Project proposals were received by the FGC Program Manager and reviewed by a Steering Committee reporting to the FGC. Criteria for project evaluation included potential to contribute to FGC objectives, probability of success, proponent ability to meet project objectives, and cost in the current and future years. The Steering Committee considered project costs and reserved the right to discuss project and budget modifications if they felt it necessary.

3.9.3 Projects and budget

Four proposals were received and reviewed. The Steering Committee recommended full funding for three projects (table 10).

Table 10 Applied Tree Improvement and Biotechnology research projects supported for 2012/13.

Project	Species	Budget ($)	Products
Parental contributions, selfing rate (Cw) and pollen contamination (Fdc) in orchard seedlots	Fdc, Cw	$117,720	Report
Lodgepole pine seed shortfall and cone induction in lodgepole pine and Douglas-fir	Pli, Fdi, Fdc	$118,800	Report
Pli climate response function for cone and seed production	Pli	$52,740	Report
Total budget		**$289,260**	

3.10 Administration

Administration of the LBIS Tree Improvement Program is provided by the Tree Improvement Branch of the MFLNRO. There are three components to this work:

- the administration of LBIS funds allocated to subprograms managed by the MFLNRO, including Tree Breeding, OTIP, Genecology and Seed Transfer, Extension and Communication, Pest Management, and Genetic Resource Information Management,
- the administration of contracts with successful proponents through the OTIP, Genecology and Seed Transfer proposal calls, and with universities and SelectSeed Company Ltd.,
- support for the business of the FGC, including scheduling meetings, assistance with information distribution, and dealing with queries and planning.

3.10.1 Costs

MFLNRO administration costs are reviewed by the FGC, and a recommendation is made for support under LBIS. The administration budget is approved by the FGC in conjunction with other LBIS Tree Improvement Program budget items.

3.10.2 Management

Overall program management is carried out on behalf of the Forest Genetics Council by the FGC Program Manager working for SelectSeed Company Ltd. This work includes planning, coordination of committees, Business Plan development, reporting, correspondence, and representing the FGC in daily business. The MFLNRO Tree Improvement Branch provides administrative support, overall financial management, and assistance with the coordination of FGC business.

3.10.3 Activities and Budget

The 2012/13 budget for the Administration Subprogram is $30,000. This amount includes all program administration costs incurred by the MFLNRO Tree Improvement Branch.

3.11 Budget Summary

A Land Base Investment Strategy Tree Improvement Program budget allocation of $3.5 million is approved for the 2012/13 fiscal year, and is summarized in Table 10.

Table 10 2012/13 budget summary for LBIS Tree Improvement Program contributions to subprograms.

Subprogram	Allocation ($ x 1000)
Genetic Conservation	220
Tree Breeding	1,062
Operational Tree Improvement Program (OTIP)	584
Expansion of Orchard Seed Supply (SelectSeed Ltd.)	540
Extension and Communication	28
Cone and Seed Pest Management	112.5
Genecology and Seed Transfer	544.2
Genetic Resource Decision Support	90
Applied Tree Improvement and Biotechnology	289.3
Administration (Tree Improvement Branch)	30
Total	**3,500**

4.0 Funding and Administrative Mechanisms

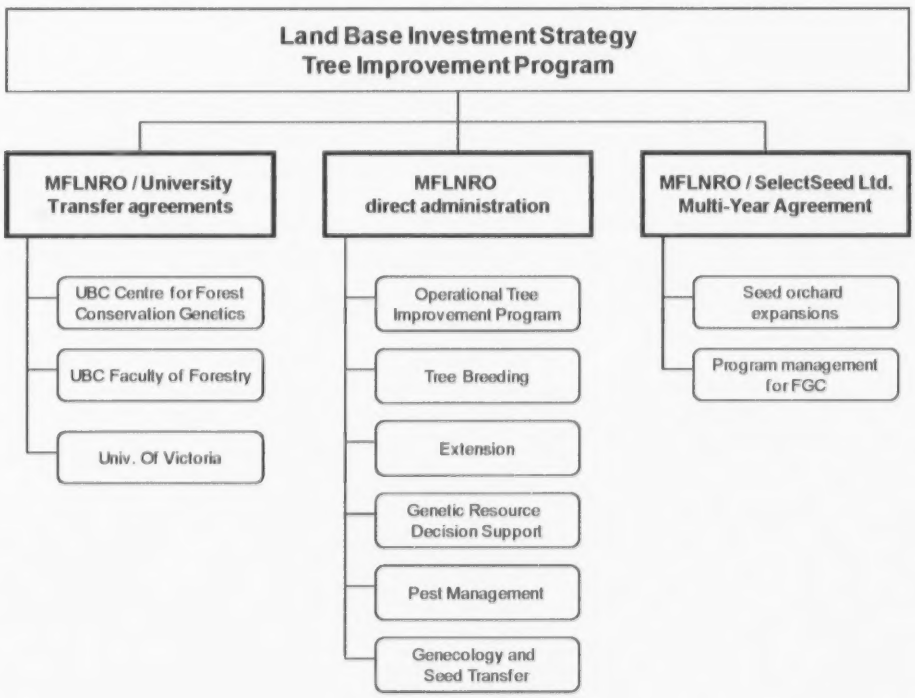
4.1 Funding Agreements

The Land Base Investment Strategy Tree Improvement program is administered by the Tree Improvement Branch of the MFLNRO. FGC Business Plan activities are supported through the following administrative mechanisms:

- MFLNRO/SelectSeed Co. Ltd. Multi-Year Agreement
- MFLNRO contracts
- MFLNRO/University contracts
- MFLNRO direct management and administration

The subprograms associated with each of the mechanisms are shown in Figure 4. Resources from other agencies include in-kind facilities, staff and direct funds. Seed sales from orchards also provide revenue to support seed production. Only Land Base Investment Program funding is detailed in this Business Plan.

Figure 4 **Administrative mechanisms for the delivery of the LBIS Tree Improvement Program funding.**



4.2 Monitoring and Reporting

Monitoring progress is an important objective of the FGC program. All LBIS funded activities report on performance relative to criteria. In addition, progress towards long-term objectives is measured at the provincial level for all FGC activities.

4.2.1 Project-Level Reporting

Projects from each subprogram provide reports to be published in the annual Tree Improvement Program Projects Report for 2012/13. Work quality will be periodically audited through Review Committees and site visits. Reports will be received and reviewed by Technical Advisory Committees or project steering committees, as appropriate, as well as by the MFLNRO Program Administrator and the FGC Program Manager. Quarterly reporting to the MFLNRO Program Administrator on spending and progress is required for all OTIP projects and for SelectSeed Ltd.

4.2.2 Provincial-Level Reporting

Progress towards FGC provincial objectives (see section 1.1) for increasing genetic worth of seedlots used, increasing the use of orchard seed, and climate-based seed transfer will be reported using provincial summaries of performance indicators. SelectSeed Company Ltd. will produce an annual report showing performance indicators, financial statements, and audit reports. Reporting requirements are identified in Table 11.

Table 11 List of reports, responsibilities, distribution, and preparation dates for LBIS-supported projects.

Type of report	Prepared by	Prepared for	Distribution	Dates due
Interim project status	Project leader	MFLNRO program administrators for early FY reallocations	On request	Aug 1
Project level	Project proponent	MFLNRO Program Administrator	On request	Oct 30 April 30
Annual reports and progress summary	FGC Program Manager, Program Administrator MFLNRO; project leader contributions	FGC; MFLNRO Chief Forester; TACs; general distribution	FGC members; TACs; FIA administrators; MFLNRO; general distribution; FGC website	April 30

* The Interim Project Status report is an informal report intended only to identify projects that are not progressing as planned, and for which funds may be re-allocated.

Appendix 1: Seed Planning Units and Categories

The following table lists seed planning units (SPU) and activity categories. All provincial SPUs are grouped to one of four categories using a protocol developed by the FGC Strategic Planning Committee. The protocol evaluates SPUs based on the net present value of tree improvement investments, feasibility criteria, zone changes due to climate change, opportunities, and seed transfer information needs. Listed SPUs in categories 1 to 3 have a Species Plan in Appendix 3. Annual planting is the 5-year mean of 2008–2012 seedling requests to SPAR. Categorization for SPUs # 6, 8 and 15, are based on an expectation of increased planting with pest resistant material. SPUs 52 and 53 are new this year and reflect a decision to proceed with orchards.

Program categories include;

1. Advanced-generation program,
2. First-generation program,
3. Genecology research only, and
4. No genetics program (SPUs in this category are not listed here).

Seed planning unit (SPU)				Program
#	Species	SPZ	Elev. band (m)	category
1	Fdc	M	1-900	1
2	Cw	M	1-700	1
3	Hw	M	1-600	2
4	Sx	NE	1000-1700	1
5	Sx	NE	1700-2100	2
6	Ss	M	1-500	2
7	Pli	NE	700-1600	1
8	Pw	M/SM	1-1000	1
9	Ba	M	1-1000	3
10	Pli	TO	700-1400	1
11	Yc	M	1-1100	2
12	Pli	PG	700-1400	1
13	Lw	NE	700-1600	1
14	Sx	PG	600-1400	1
15	Pw	KQ	500-1400	1
16	Pli	TO	1400-1600	2
17	Pli	BV	700-1400	1
18	Pli	CP	700-1300	1
19	Fdc	SM	200-1000	2
20	Pli	NE	1600-2000	2
21	Fdi	NE	400-1200	1
22	Fdi	NE	1000-1800	2
23	Sx/Ss	SM/NST	all	3
24	Hw	M	600-1100	2
25	Sx	EK	750-1900	2
26	Pli	PG	1400-2000	3
27	Cw	SM	200-1000	2

Seed planning unit (SPU)				Program
#	Species	SPZ	Elev. Band (m)	category
28	Sx	TO	1300-2100	2
29	Pli	EK	1500-2000	2
30	Sx	TO	700-1500	1
31	Fdc	M	900-1200	2
32	Pli	EK	800-1500	2
33	Cw	M	700-1500	2
34	Lw	EK	800-1700	1
35	Sx	BV	500-1400	2
36	Bg	M	1-700	3
37	Fdi	QL	700-1400	2
38	Hw	M north	1-600 (part of SPU 3)	2
39	Fdi	EK	700-1400	2
40L	Sx	PR low	<650	2
40M	Sx	PR mid	650-1200	2
41	Fdi	PG	700-1200	2
42	Sx	PG	1200-1550	2
43	Fdi	CT	600-1400	2
44	Sx	NE	1-1000	1
45	Pli	BB/CHL	All	3
46	Bl	all int.	all	3
47	Bn	M	all	3
48	Broadleaves	Interior	-	3
49	Broadleaves	Coast	-	3
50	Lw	NE	1200-1800	2
51	Py	S. Interior	300-1200	2
52	Fdi	TO	600-1100	2
53	Fdi	TO	1100-1600	2

Note regarding seed zone changes
Seed zones are adjusted from time to time based on new research information, or on administrative needs. For information updates on seed zones, please contact Lee Charleson of the Ministry of Forests and Range Tree Improvement Branch (lee.charleson@gov.bc.ca)

Appendix 2: Forest Genetics Council and Technical Advisory Committee Members

Forest Genetics Council of BC

Name	Affiliation	Representing
Brian Barber (Co-Chair)	MFLNRO Tree Improvement. Branch	MFLNRO Co-Chair
Kerry McGourlick (Co-Chair)	Western Forest Products Inc.	Industry Co-Chair
Raoul Wiart	Canadian Forest Service	Canadian Forest Service
Dr. Rob Guy	University of BC	Universities
Scott King	Lousiana Pacific	Southern interior industry
Joe Leblanc	Interfor Ltd.	Coast industry
Patti Kagawa	BC Timber Sales	BC Timber Sales Ltd.
Tim Lee	Vernon Seed Orchard Co.	Interior Technical Advisory Committee
Larry Gardner	West Fraser Timber Ltd.	Interior industry orchard owners
Dan Peterson	MFLNRO, Southern Int. Region	MFLNRO
John Mitchell	TimberWest Forests ltd.	Coast industry orchard owners
Barrie Phillips	MFLNRO Tree Improvement. Branch	MFLNRO
Annette van Niejenhuis	Western Forest Products Inc.	Coastal Technical Advisory Committee
Gernot Zemanek	Roserim Forest Nursery	Woodlots and nurseries

Genetic Conservation Technical Advisory Committee

Name	Affiliation	Name	Affiliation
Dave Kolotelo (Chair)	MFLNRO Tree Imp. Branch	Dr. Michael Murray	MFLNRO SI Region
Dr. Sally Aitken	University of BC	Tory Stevens	Ministry of Environment
Charlie Cartwright	MFLNRO Tree Imp. Branch	Alan Vyse	Independent
Lee Charleson	MFLNRO Tree Imp. Branch	Dr. Tongli Wang	University of BC
Dr. Andreas Hamann	University of Alberta	Jack Woods	SelectSeed Ltd. / FGC
Jodie Krakowski	MFLNRO Squamish District	Dr. Alvin Yanchuk	MFLNRO Tree Imp. Branch

Coastal Technical Advisory Committee

Name	Affiliation	Name	Affiliation
Annette van Niejenhuis (Chair)	Western Forest Products Inc.	David Reid	MFLNRO Tree Imp. Branch
Dr. Sally Aitken	University of BC	Dr. John Russell	MFLNRO Tree Imp. Branch
Charlie Cartwright	MFLNRO Tree Imp. Branch	Brian Saunders	Consultant
Tim Crowder	TimberWest Forests Company Ltd.	Dr. Michael Stoehr	MFLNRO Tree Imp. Branch
Diane Douglas	MFLNRO Tree Imp. Branch	Dr. Joe Webber	ProSeed Consulting
Dr. John King	MFLNRO Tree Imp. Branch (Emeritus)	Dr. Chang-yi Xie	MFLNRO Tree Imp. Branch
Dave Kolotelo	MFLNRO Tree Imp. Branch	Dr. Alvin Yanchuk	MFLNRO Tree Imp. Branch
Bob Merrell	BC Timber Sales Ltd.		

Interior Technical Advisory Committee

Name	Affiliation	Name	Affiliation
Tim Lee (Chair)	Vernon Seed Orchard Co.	Dan Livingstone	PRT Growing Services Ltd.
Guy Burdikin	West Fraser Timber Ltd.	Mike Madill	MFLNRO, SI Region
Dr. Michael Carlson	MFLNRO Tree Imp. Branch (emeritus)	Anna Monetta	MFLNRO, NI Region
Krista Copeland	Tolko Ltd.	Wayne Nuyens	West Fraser Timber Ltd.
Vince Day	Canadian Forest Products Ltd.	Greg O'Neill	MFLNRO Tree Imp. Branch
Diane Douglas	MFLNRO Tree Imp. Branch	Roger Painter	SelectSeed Ltd.
Dan Gaudet	Vernon Seed Orchard Company	Doug Perdue	Dunkley Lumber
Hilary Graham	MFLNRO Tree Imp. Branch	David Reid	MFLNRO Tree Imp. Branch
Barry Jaquish	MFLNRO Tree Imp. Branch	Chris Walsh	MFLNRO Tree Imp. Branch
Dave Kolotelo	MFLNRO Tree Imp. Branch		

Extension Technical Advisory Committee

Name	Affiliation	Name	Affiliation
Diane Douglas (Chair)	MFLNRO Tree Imp. Branch	Debbie Poldrugovac	MFLNRO Tree Imp. Branch
Dr. Sally Aitken	University of BC	Kathie Swift	FORREX
Charlie Cartwright	MFLNRO Tree Imp. Branch	Dave Trotter	Min. of Agriculture and Lands
Tim Crowder	TimberWest Ltd.	Nick Ukrainetz	MFLNRO Tree Imp. Branch
Hilary Graham	MFLNRO Tree Imp. Branch	Tia Wagner	Tolko Ltd.
Tim Lee	Vernon Seed Orchard Company Ltd.	Jack Woods	SelectSeed Ltd. / FGC
Roger Painter	SelectSeed Ltd.		

Pest Management Technical Advisory Committee

Name	Affiliation	Name	Affiliation
Jim Corrigan (Chair)	MFLNRO, Tree Imp. Branch	Dr. Michael Stoehr	MFLNRO Tree Imp. Branch
Tim Crowder	TimberWest Forests Ltd.	Dr. Jean Turgeon	Canadian Forest Service
Dan Gaudet	Vernon Seed Orchard Company	Chris Walsh	MFLNRO, Tree Imp. Branch
Hilary Graham	MFLNRO Tree Imp. Branch	Jack Woods	SelectSeed Ltd. / FGC

Decision Support Advisory Committee

Name	Affiliation	Name	Affiliation
Guy Burdikin (Chair)	West Fraser Timber Ltd.	Matt Leroy	MFLNRO Tree Imp. Branch
Lee Charleson	MFLNRO Tree Imp. Branch	Michael Postma	MFLNRO Tree Imp. Branch
Cathy Cook	Western Forest Products Inc.	Chris Runnals	MFLNRO SI Region
Vince Day	Canadian Forest Products Ltd.	Jack Woods	SelectSeed Ltd. / FGC
Dan Gaudet	Vernon Seed Orchard Company	Susan Zedel	MFLNRO Tree Imp. Branch

Seed Transfer Technical Advisory Committee

Name	Affiliation	Name	Affiliation
Lee Charleson (Chair)	MFLNRO Tree Imp. Branch	Dr. Greg O'Neill	MFLNRO Tree Imp. Branch
Dr. Sally Aitken	University of BC	Dr. John Russell	MFLNRO Tree Imp. Branch
Guy Burdikin	West Fraser Timber Ltd.	Nick Ukrainetz	MFLNRO Tree Imp. Branch
Diane Douglas	MFLNRO Tree Imp. Branch	Annette van Niejenhuis	Western Forest Products Inc.
Scott King	Louisiana Pacific Ltd.	Craig Wickland	MFLNRO Coast Region
Jodie Krakowski	MFLNRO Squamish District	Jack Woods	SelectSeed Ltd. / FGC
Leslie McAuley	MFLNRO Tree Imp. Branch		

Appendix 3: Species Plans

Species plans present information for seed planning units with active or planned breeding programs, seed orchards, or genecology work, including SPUs that are not supported through LBIS Tree Improvement Program funding. Information presented includes breeding strategy (where applicable), seed orchard production forecasts, gain forecasts, historic seed use, seed in storage, genetic conservation status, and genecology/seed transfer projects. The plans are organized by species.